

Bird Basics

I. Anatomy: Why Birds Can Fly

A. Light weight

1. Hollow bones strengthened by internal cross bracing
2. Skeleton about 5% of total body weight
3. Very strong sternum as mounting point for flight muscles
4. Toothless bills made of keratin—no heavy teeth and jawbones
5. Short humerus, long radius and ulna, fewer joints

B. Great strength

1. Strong muscles—pectorals about 33% of total body weight
2. Low center of gravity for stability in flight

C. Efficient body systems

1. Full circulation

- a. Require great amounts of food and oxygen
- b. Large strong heart for high blood volume
- c. Arteries to pectorals nearly as large as aorta
- d. Constant air supply
- e. Unique respiratory system for high oxygen needs
- f. No diaphragm—air is pumped through lungs by movements of the thoracic cavity.
- g. No alveoli—air capillaries allow air to flow through lungs instead of just in and out.
- h. Inhales and exhales twice to move each breath
- i. Special cooling system—cool fresh air moves into the air sacs, absorbing excess heat from organs and moisture within the air sacs is evaporated.

2. Rapid digestion

- a. Eats often and stores little waste
- b. Crop—enables some birds to store and moisten food and release it in a steady stream to the rest of the digestive system.
- c. Gizzard—birds have no teeth to grind food.

D. Sharp senses

1. Keen eyesight—predatory birds can spot prey from high altitudes. Some birds spot juicy insects in flight. Birds keep track of predators. Eyes are relatively huge.
2. Keen hearing—some birds fly and navigate by echoes.

II. Motions

A. Feather types

1. Contour feathers for streamlining
2. Flight feathers
3. Down for insulation

- B. Forces of flight—light weight, thrust, drag
- C. Flight—downstroke, upstroke
- D. Intermittent flight—flapping, gliding, wings folded
- E. Hovering in place
- F. Controlling flight—pitch, roll, yaw
- G. Landing

III. Identification

- A. Habitats
- B. Nests
- C. Form and function
 - 1. Body size and shape
 - a. Age
 - b. Sex
 - c. Species
 - 2. Bill shapes
 - a. Cracking bill—short, stout for cracking hard seed (finches)
 - b. Gaping bill—hinged jaws for catching insects in flight (whippoorwill)
 - c. Chiseling bill—heavy, shaped like daggers (woodpeckers)
 - d. All-purpose bill—straight, strong and pointed for a diverse diet (crows)
 - e. Tearing bill—sharp mandibles for tearing flesh (birds of prey)
 - f. Piercing bill—long, spearing bill for lancing fish (herons)
 - g. Fruit-slicing bill—serrated edges for slicing into soft fruits
 - h. Probing bill—to extract nectar from deep within flowers
 - i. Straining bill—to capture food particles in water (ducks)
 - j. Scooping bill—large pouched bill for scooping fish (pelican)
 - k. Long, thin bills—for eating insects off vegetation (oriole)
 - 3. Types of feet
 - a. Perching feet—3 forward toes and 1 hind toe (songbirds)
 - b. Grasping feet—sharp, curved talons (eagles, hawks)
 - c. Climbing feet—2 forward toes and 2 hind toes (woodpeckers)
 - d. Scratching feet—long, straight toes (chickens)
 - e. Running feet—3 forward toes, 1 very small hind toe or none at all (plover)
 - f. Swimming feet—strong flexible skin forming paddles (ducks)
 - g. Wading feet—webbing between toes (flamingo)
 - 4. Wing shapes
 - a. Gliding—long, narrow wings (albatross)
 - b. Soaring—large, broad wings (hawk)
 - c. High-speed diving—narrow wings (falcon)
 - d. Hovering—short, tapered wings (hummingbird)
 - e. Maneuvering in close quarters—short, broad wings (wren)
 - f. Fast agile flapping flight—tapered wings (swift)

5. Tail shapes

- a. Long, narrow tails—quick maneuvering between trees and other obstacles in the forest (wrens)
- b. Shorter, wider tails—flapping birds (pigeons)
- c. Large, fanlike tails—extra lift and control (eagles, hawks)
- d. Smaller tails—aquatic maneuvering (ducks, albatrosses)

D. Markings

IV. Behavior

A. Communication

1. Audible

- a. Syrxinx
- b. Calls or short, characteristic noises
- c. Songs

2. Visual—body language

- a. Head bobbing and tail flickering—to warn of approaching danger
- b. Raising crest—to assert dominance
- c. Wings spread and head and bill up—to express displeasure at a rival entering territory
- d. Head thrust forward, mouth open, wings drooping—when defending territory
- e. Feather fluffing—to make self look larger

B. Actions

- 1. Bird baths, dusting
- 2. Anting
- 3. Rubbing substances into feathers
- 4. Mobbing and fighting
- 5. Outsmarting the foe

C. Migration

- 1. Flyways
- 2. Altitudinal migration